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PAPER PRESENTED BY Bonnie J. Buratti
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SPECIALINSTRUCTIONS:

Iapetus: New Evidence for an External Origin of its Dark Side

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The Saturnian satellite Iapetus is unique among the satellites of the Solar System in that one side reflects more than 10 times as much radiation as the other side. Two classes of models have developed to explain this dichotomy: in one class the albedo variegations are formed by endogenous geologic activity and in the other class they are formed by exogenous alteration processes. The major line of evidence supporting the former type of model is geomorphological. Voyager images reveal a seemingly well-defined interface between the two albedo domains, and dark floors exist in some of the larger craters on the bright side. The position of the dark side of Iapetus - it is centered on the satellite's apex of motion through space - strongly suggests that it was exogenously produced.

Approximately 12 ultraviolet Voyager images of Iapetus have been photometrically corrected, registered, and projected to produce a map of normal reflectance covering both hemispheres. These maps demonstrate that the interface between the dark and bright regions of Iapetus is in fact gradual (see Figure). The observations are consistent with an exogenous origin to the dark side, perhaps involving micrometeoritic impact and subsequent volatization of surficial material. The resulting lag deposit may be an example of the dark, reddish, possibly organic rich material which is found on other satellites in the outer Solar System and on the D-type asteroids (Funded by NASA).

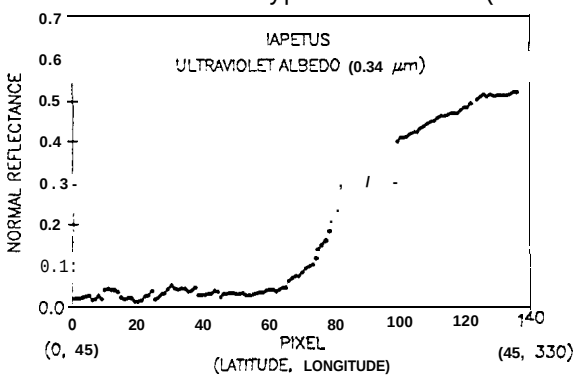

Figure. A scan of reflectance, extracted across Iapetus's bright/dark interface. The albedo change is gradual.

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